

REMARKS

Claims 1-15 are pending in the present application.

It is respectfully submitted that this Response is fully responsive to the Office Action dated April 17, 2006.

Request to Withdraw the Finality of Office Action

The Status of this Office Action is unclear. For example, the “Office Action Summary” indicates that this action is non-final; whereas, the “Detailed Action” indicates that this Action is made final. However, if this Action is final, then Applicants respectfully submit that such determination is premature and request that the Examiner withdraw such finality.

For example, in the response to the previous Office Action dated December 22, 2005, independent claim 1 was not amended and the amendments to claims 2, 4-6 and 11-15 were only for rectifying the informalities which the Examiner pointed out. Furthermore, *US 6,472,755 B1*, which is the basis for the claim rejections present in this Office Action, is a newly cited reference.

Taking these facts into consideration, Applicants stress that this Office Action should be non-final. See MPEP 706.07.

Claim Rejections - 35 U.S.C. 102

Claims 1, 2, 3, 7, 8, 9, 11, 12, 13, 15 were rejected under 35 U.S.C. §102(b) as being anticipated by *Ngo et al* (US 6,472,755 B1). Applicants respectfully traverse the Examiner's anticipation rejection for the following reasons.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Here, *Ngo et al.* does not describe the step of *concurrently spraying nitrogen gas and water on the surface of the interconnection layer buried in the opening*. Therefore, the Examiner's rejection is unsupported by the art and should be withdrawn.

Moreover, *Ngo et al.* discloses that CMP is conducted followed by double-sided brush scrubbing with water to form Cu lines 23 and then the planarized surface is treated with a high strength ammonia plasma. Thus, although the Examiner asserts that the consecutive steps of double-sided brush scrubbing with water and treating the planarized surface with a high strength ammonia plasma in *Ngo et al.* correspond to the step of concurrently spraying nitrogen gas and water in the present invention, it is clear that no single step of concurrently spraying nitrogen gas and water on the surface of Cu lines is found and no step of spraying nitrogen gas in the descriptions.

Also, the present invention according to claim 1 is substantially different from the art disclosed in *Ngo et al.* as described in detail below.

The present invention according to claim 1, for example, has a feature that nitrogen gas and water are concurrently sprayed on the surface of the interconnection layer buried in the openings. The nitrogen gas and water are not separately sprayed on the surface but are concurrently sprayed on the

surface in the present invention. This feature of the present invention, for example, offers the technical effect that the rate of generating the conduction defects of the interconnection layer is suppressed low and the stress-migration resistance of the interconnection layer is increased, due to the behaviors of both nitrogen gas and water.

Whereas, in *Ngo et al.*, the step of double-sided brush scrubbing with water and the step of treating with a high strength ammonia plasma are separately and independently performed each other. In other words, dry process of treating with ammonia plasma is performed after the wet process of the brush scrubbing is performed in *Ngo et al.* The water used in the brush scrubbing is never sprayed on the surface concurrently with ammonia plasma in the step after the brush scrubbing.

Furthermore, ammonia plasma is used in *Ngo et al.*, while nitrogen gas is sprayed concurrently with water in the present invention. It is no doubt that ammonia plasma cannot be correspond to nitrogen gas in terms of physical state.

The present invention is also distinct, for example, from the double-sided brush scrubbing with water described in *Ngo et al.* For instance, in the double-sided brush scrubbing following CMP, a surface of an insulating film with an interconnection layer buried in it is scrubbed with a brush to remove particles such as abrasive particles contained in a slurry with water flowing on the surface. However, this process never corresponds to the step of spraying nitrogen gas and water on the surface.

For at least the reasons discussed above, *Ngo et al.* fails to teach the step of concurrently spraying nitrogen gas and water on the surface in the present invention.

Accordingly, *Ngo et al.* does not anticipate claim 1 and dependent claims 2, 3, 7-9, 11-13 and 15 of the present invention.

Regarding Claim Rejections - 35 U.S.C. 103

Claims 4-6, 10 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Ngo et al.* in view of *Li et al.* (2004/0219795 A1).

As described above, the present invention according to claim 1 cannot be anticipated by *Ngo et al.* For example, even if *Ngo et al.* were further combined with *Li et al.*, it is clear that the present invention according to these dependent claims would have been unobvious to one of ordinary skill in the art at the time the invention was made.

Accordingly, Applicants respectfully request that the Examiner withdraw the obviousness rejections of claims 4-6, 10, and 14.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Application No. 10/816,958
Attorney Docket No. 042323

Response under 37 C.F.R. §1.116
Response Filed: July 17, 2006

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

A handwritten signature in black ink, appearing to read "Darrin A. Auito", is written over the printed name.

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